A conceivable interpretation for micro phenomena to avoid explaining the relevant measure result by probability

Wei Guo[1]

Department of mathematics Fudan University, Shanghai, 220 Handan Road,200433,China

Abstract

Today, the scientific community comprehensively accepts the viewpoint of interpreting micro phenomena by probability. Here, we argue that probability is not the instinct of reality but merely caused by how the micro phenomena are measured by us. By tracing back to the very beginning, today's cognition originates from an interpreting difficulty when we try to measure micro phenomena: we cannot simultaneously measure the conjunctive properties of micro phenomena. Logically speaking, there are two possible causes that can lead to this consequence, which are not only the relation between conjunctive properties, but also whether we could really measure them 'simultaneously'. If the reason is attributed to the former possible cause, we would inevitably follow the path of Heisenberg's uncertainty relation and build the current quantum mechanical system. In this paper, we instead focus on the latter possible cause and find that although the current time measure precision seems to be quite high, it leads to various 'irrational' measure results on micro phenomena.

Keywords: time measure; micro; probability; uncertainty principle.

Contents

[1] Email: 09210180002@fudan.edu.cn, woweizuiqiang@gmail.com and iamjolina@hotmail.com

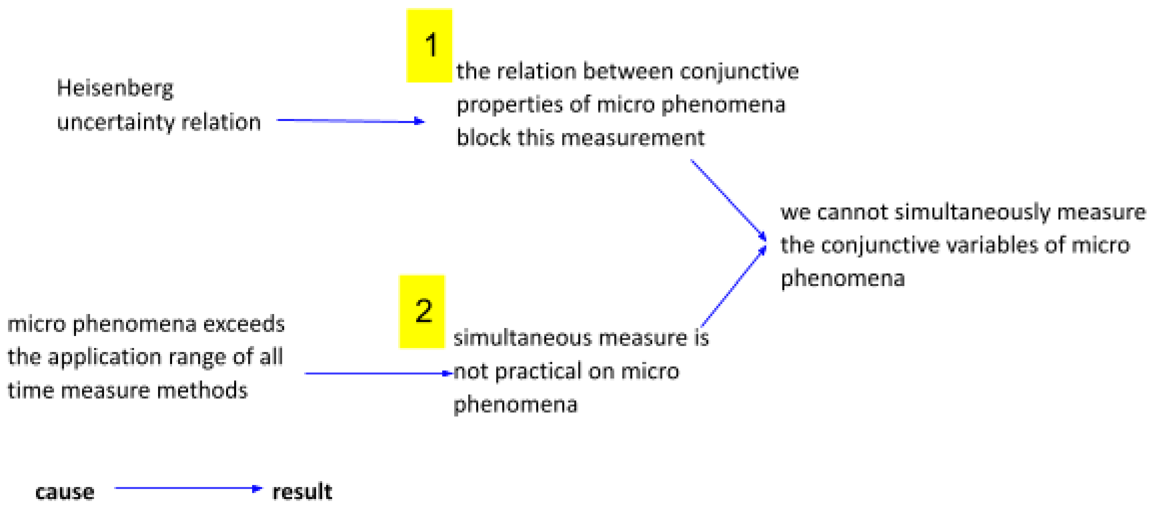
1 Introduction

Today, according to the current quantum mechanical system, various interpretations for reality show more and more fantastical characteris. More and more quantum theories describe reality as a world that is dependent on either our observation or even adding extra parallel reality into reality. The key of the matter is that if we attribute the uncertainty of the measurement to the uncertainty relations of conjugate variables, considering conjugate variables must involve at least one property of the particle such as position,momentum or energy, this inevitably results in a logical destination: something that belongs to the particle causes the uncertainty, which means reality is instinctively uncertain, no matter whether we measure or not. So, the subsequent theories are naturally created so as to describe such an 'uncertain' reality. Although this process has been under the frame of mathematics, What math can help us is to guarantee the validity in every intermediate link of the logical process but not to help us to make the correct judgment when facing two possible options. If choosing the wrong one, mathematics could instead do a disservice to 'precisely' lead all the following ways to a fallacious terminus. In the following, we will review and reconsider the whole logic behind this issue.

2 From the current time measure precision to explain why we cannot simultaneously measure the conjunctive properties of micro phenomena

Now let us review the foundation for quantum mechanics, which originates from a measuring difficulty: we cannot simultaneously measure the conjunctive properties of a micro phenomena. Obviously, there are three keywords in this description: 'micro phenomena', 'conjunctive properties' and 'simultaneously'. Logically speaking, these three keywords tell us two essential things: Firstly, such a measuring difficulty only happens on micro phenomena. Secondly, this measuring issue can and can only be caused by either some instinct relation between conjunctive properties or whether we could really measure them 'simultaneously', which is shown in the below Fig. 1.

Fig. 1. All possible causes for generating the measuring uncertainty in micro phenomena



From Fig. 1, we can see that the Heisenberg uncertainty relation is not the unique option for us to explain the ultimate measuring issue. Only if we attribute the measure issue to the 1st cause, Heisenberg uncertainty relation would become the inevitable original cause. Usually, we treat the Fourier transform as the convincing evidence for such an uncertainty relation. However, it only mathematically illustrates the inherent discrepancy when measuring some particular pairs of properties simultaneously but not explain why.

Now let us analyze the possibility of the 2nd path. Now let us conceive of a micro particle that repeatedly rotates around an atomic nucleus with a periodically changing speed within the range of [10^{19},$8\cdot10^{19}$] rounds/s. Considering it rotates outside the atomic nucleus and mostly inside the atom, if each complete round trip of the electron is equivalently transformed to a perfect circle, the average diameter of such a circle can be assumed to be approximately 10^{-12}m, which is the average value of the diameter of atomic nucleus(between 10^{-15}m and 10^{-14}m) and the diameter of atom (10^{-10}). The behavior of such a hypothetical particle is realistic due to its maximum linear speed $v_{max}=8\cdot10^{19}\cdot\pi\cdot10^{-12}\approx2.5\cdot10^{8}$ m/s$<3\cdot10^{8}$ m/s, which is not superluminal. However, our most accurate time measure precision today is no less than 10^{-19}s[*1*], which means a ‘time point’ for this particle is not a precise point but actually a time period. This period, although quite short, permits it to complete at least an entire round, which means it can appear at all different possible positions along its one cycle locus at a ‘time point’ of 10^{-19}s. Therefore, the behavior of this hypothetical particle in our view is uncertain at a ‘time point’ and hence we can only describe it through probability. Further, according to the hypothesis, its speed periodically changes within [10^{19},$8\cdot10^{19}$] rounds/s. Hence, it may pass by multiple positions with the same speed or momentum during 10^{-19}s. In other words, a specific speed or momentum could be corresponding to more positions where it ever passes by. In short, the more precisely we measure the momentum, the more difficult its position could be identified. Similarly, if this particle passes by the same position with different speeds for multiple times during 10^{-19}s and we also repeat the experiment again and again, the more precisely we locate its position, the more possibilities its speed or momentum could have. Therefore, it is not strange for such a micro phenomenon to show the uncertainty in our view.

Although two paths in the above Fig. 1 are equivalent in the logical view, compared with the 1st path, the 2nd path is obviously more fundamental because without the flow of time, any conjunctive properties would not have any derivation and without the derivation, there is no need to discuss the product of two deviations satisfy what kind of a inequation. Not only that, in the view of the 2nd path, we can explain the reason for micro phenomena's many other 'magic' or irrational performances.

Firstly, without the wave function collapse, we can also explain why the measure value of a physical property is deterministic in a single measurement but different in multiple measurements. In a single measurement, we measure the property at a random time point during 10^{-19}s, so it is deterministic. However, the next measurement may occurs at any other precise time point during 10^{-19}s, hence the location or other status of the micro phenomenon would be different. Hence, the explanation of wave function collapse can be viewed to mistake 'observer passively observe a specific status of reality at a random time point during the period of 10^{-19}s' for 'observers could actively determine the status of reality'.

Secondly, in the view of the 2nd path, there is no specialness for the quantum tunneling effect, which is no different from our cognition in macro phenomena. For this effect, we actually make a preceding judgment, which is 'a particle's total energy is less than the potential barrier's height'. Accurately speaking, energy for the particle and barrier needs to be compared at the same time. Thus, this is also a question of 'simultaneously measurement'. However, even though the particle's total energy occasionally surpasses the potential barrier's height at some precise time point during 10^{-19}s, we still cannot notice such an extremely short moment due to the limit of measuring precision. In other words, the above judgment of comparison only holds true at a random time point during 10^{-19}s but we regard it can represent all time points during 10^{-19}s. In this view, the quantum tunneling effect is a natural and unsurprising result caused by our measuring behavior rather than the 'magic' instinct of reality.

Thirdly, we can also easily understand why micro phenomena often seem to show the characteristic of disorder in either time or causality, which means 'the same cause could lead to different results' or 'the consequence occurs before or affects the cause'. This counterintuitive problem also originates from the time period of 10^{-19}s that is falsely regarded as a precise time point for micro phenomena.

For any two events that occur at two precise time points during 10^{-19}s, even though they constitute a causality, their occurring subsequence would not be fixed in each experiment.

Lastly, we can also understand why the current physical system only views the spin of a particle as an intrinsic property rather than the rotation from classical view. If a particle rotates so fast that it can rotate more than one round during 10^{-19}s, its spin direction measured at each time actually occurs at a random time point during 10^{-19}s but we are not sure which exact time point. It leads to an illusion that the particle's spin direction is superposition and only when we measure it, it shows a precise result.

In a word, although the current highest time measure precision seems to be quite high, it is actually not high enough for us to measure micro phenomena. What is uncertain is not reality but the exact time point when the measurement occurs. If we ignore this, reality has to be added by an extra feature of 'uncertainty', 'superposition' or even extra parallel reality for explanation.

REFERENCES

[1] Brewer, S. M.; Chen, J.-S, et al. Al+27 Quantum-Logic Clock with a Systematic Uncertainty below 10^{-18}. *Phys. Rev. Lett*. **123**, 3-4 (2019).